

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Wireless Telecommunications Bureau Seeks)	WT Docket No. 13-135
Comment on the State of Mobile Wireless)	
Competition)	

**COMMENTS OF PCIA – THE WIRELESS INFRASTRUCTURE ASSOCIATION
AND THE HETNET FORUM**

Jonathan M. Campbell
Director, Government Affairs

D. Zachary Champ
Government Affairs Counsel

Alexander Blake Reynolds
Government Affairs Counsel

PCIA – The Wireless Infrastructure Association
500 Montgomery Street, Suite 500
Alexandria, VA 22314

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I. INTRODUCTION AND SUMMARY

PCIA – The Wireless Infrastructure Association and The HetNet Forum¹ (“PCIA”) respectfully submits these comments on behalf of its members in response to the Federal Communications Commission’s (“FCC” or “Commission”) Public Notice seeking comment on the state of competition in the mobile wireless industry.² PCIA is pleased to provide the Commission with information pertaining to the infrastructure segment of the wireless industry.

The wireless infrastructure industry is characterized by competition that continues to increase from year to year. Diversity in competitors and infrastructure solutions have led to world-leading 4G network deployment and facilitated market entry and effective competition

¹ PCIA is the national trade association representing the wireless infrastructure industry. PCIA’s members develop, own, manage, and operate towers, rooftop wireless sites, and other facilities for the provision of all types of wireless, telecommunications, and broadcasting services. PCIA and its members partner with communities across the nation to effect solutions for wireless infrastructure deployment that are responsive to the unique sensitivities and concerns of each community.

The HetNet Forum, formerly The DAS Forum, is a membership section of PCIA dedicated to the advancement of heterogeneous wireless networks.

² *Wireless Telecommunications Bureau Seeks Comment on the State of Mobile Wireless Competition*, WT Docket No. 13-135, Public Notice, DA 13-1139 (rel. May 17, 2013) (“Public Notice”).

among carriers and infrastructure providers alike. Competition in the wireless infrastructure industry both facilitates and is facilitated by competition in the rest of the wireless industry.

With demand for next-generation wireless services acutely high – mobile data used on cellular networks in the United States increased by 56 percent from 2011 to 2012 – carriers and infrastructure providers are investing significant capital into expanding and improving networks to meet this demand. In 2012, carriers and infrastructure companies invested over \$28 billion and \$658 million, respectively, in new deployment, upgrades, and modifications across the network. Investment in Long Term Evolution (“LTE”) alone reached almost \$8 billion in that same year.

The increasing number of deployment options is another marker of a competitive wireless infrastructure industry. As consumer demand for wireless services continues to grow, carriers are looking to add up to 27,000 additional cell sites in 2013. Driven by the need to expand capacity, carriers are relying more on Heterogeneous Networks (“HetNets”).³ Within these HetNets, macro sites and small cells, including distributed antenna systems (“DAS”), are leveraged to respond to carriers coverage and capacity needs in a tailored fashion. As a result, diversification of infrastructure solutions is creating more opportunities for competition within the infrastructure industry.

The presence of robust competition in this industry does not mean that barriers to competition that may threaten its continued success do not exist. PCIA urges the Commission to remain vigilant against regulations that do not keep pace with industry trends and technological advancements, particularly with respect to the siting of wireless infrastructure and small cells.

³ “Heterogeneous network” is a term used to describe the combination of “macro”, or large, infrastructure such as monopoles with small cells and distributed antenna systems. By integrating the two types of infrastructure together, carriers are able to target geographic areas to increase network capacity.

Such regulations are potential landmines that the Commission must remove in order for competition to continue to flourish.

II. THE WIRELESS INFRASTRUCTURE INDUSTRY IS A CRUCIAL SEGMENT THAT CONTRIBUTES TO ROBUST COMPETITION WITHIN THE WIRELESS INDUSTRY

The wireless infrastructure industry is more competitive than ever, fostering high levels of private capital investment and new technological innovation that, in turn, is utilized by consumers and businesses that rely on mobile broadband. Today, more than thirty-five percent of the people in the United States have cut the cord in their homes and rely solely on their wireless connections.⁴ Wireless infrastructure has enabled that shift, and will become even more critical as wireless devices continue to migrate in-building.

The amount of mobile data used on cellular networks in the United States increased by 56% from 2011 to 2012, totaling 139,196 TB/month.⁵ The mix of users is shifting away from the pattern of a few people using a lot of data, to more people using more data. For example, data use by the biggest users grew by 7.5% from 2011 to 2012.⁶ But data use of those that use the least amount of data grew by more than 30% from 2011 to 2012.⁷ This demographic shift appears to be the result of users taking advantage of the increased speed and functionality enabled by increased network capacity.

Wireless networks will be challenged by consumer data use, but consumers will not be the only users of the network. Machine-to-machine (“M2M”) data traffic is expected to account

⁴ Steven J. Blumberg, Ph.D. & Julian V. Luke, *Wireless Substitution: Early Release of Estimates From the National Health Interview Survey, July-December 2011*, CENTERS FOR DISEASE CONTROL AND PREVENTION (2012), available at <http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201206.pdf> (last visited June 17, 2013).

⁵ iGR, GLOBAL MOBILE DATA TRAFFIC FORECAST, 2011–2016: UP, UP AND UP SOME MORE (2012).

⁶ *Id.*

⁷ *Id.*

for ten percent of the wireless data market in the United States by 2015.⁸ Globally, M2M data traffic is expected to increase 82 percent by 2017.⁹ M2M applications include telehealth, shipping and logistics, utility and environmental monitoring, industrial/agricultural automation, and asset tracking, all of which require mobile data connections.¹⁰ In the United States alone, the number of M2M connections is expected to grow from 33.3 million in 2012 to 114.7 million in 2016.¹¹ The infrastructure to support more, and more sophisticated, M2M applications must be put in place now.

Owners and operators of wireless infrastructure vary from federal, state, and local governments, to wireless carriers, utilities and tower companies, to small, independent companies and individual owners. Diversity and competition in the wireless infrastructure industry are also exemplified by the growing variety of wireless facilities. Today, wireless infrastructure includes macro sites¹² such as lattice towers, guyed towers and monopoles; collocations¹³ on towers or buildings, water towers, steeples and the like; and small cell solutions like DAS, picocells, metrocells, femtocells and more.

⁸ *M2M*, TIA, <http://www.tiaonline.org/m2m> (last visited June 17, 2013).

⁹ *Cisco Visual Networking Index: Forecast and Methodology, 2012-2017*, CISCO SYSTEMS, INC., 2 (May 29, 2013), http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-481360.pdf.

¹⁰ M. Zubair Shafiq, et al., *A First Look at Cellular Machine-to-Machine Traffic – Large Scale Measurement and Characterization*, MICHIGAN STATE UNIVERSITY (2012), http://www.cse.msu.edu/~alexliu/publications/M2M/M2M_SIGMETRICS2012.pdf.

¹¹ *Why Most M2M Forecasts Are Wrong*, PR NEWswire (Nov. 7, 2012), <http://www.prnewswire.com/news-releases/why-most-m2m-forecasts-are-wrong-compass-intelligence-explains-and-states-the-m2m-market-will-reach-1147-million-connections-by-year-end-2016-177628091.html>.

¹² A “tower” is “any structure built for the sole or primary purpose of supporting FCC-licensed antennas and their associated facilities,” and includes lattice towers, guyed towers and monopoles. *See* Nationwide Programmatic Agreement for the Collocation of Wireless Antennas (2001), 47 C.F.R. Part I, Appendix B, at § I.B. (“Collocation Agreement” or “2001 NPA”).

¹³ A “collocation” means “the mounting or installation of an antenna on an existing tower, building or structure for the purpose of transmitting and/or receiving radio frequency signals for communications purposes.” Collocation Agreement, § I.A. Traditionally, collocations are considered macro sites. *See in re* Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market

The wireless infrastructure landscape continues to adapt to the increase in mobile broadband demand. Carriers and infrastructure providers are coming up with creative solutions to meet network capacity needs through densification.¹⁴ HetNets are an emerging deployment option for service providers.¹⁵ HetNets utilize a variety of technologies to link to the macrocellular network, enabling seamless voice and data communications. Components of the HetNet can include DAS, femtocells, picocells, remote radio units, and other telecommunications equipment.

The ability to effectively meet the increased demand for wireless communications depends on sound wireless infrastructure. Wireless carriers and infrastructure providers are investing billions of dollars to expand and improve wireless networks. Growth within the wireless industry facilitates and improves competition between wireless service providers. Additionally, continued growth within input segments, especially the wireless infrastructure industry, are all indicators of vibrant competition within the wireless industry.

A. Increasing Capital Expenditures by Carriers and Wireless Infrastructure Providers Are Positive Indicators of Growth and Competition within the Wireless Industry

Capital expenditures in network improvements are among of the clearest indicators of the growth of the wireless industry.¹⁶ Technological upgrades, coverage expansion, capacity and quality-of-service improvements are at the core of competition for service providers, carriers,

Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, *Fifteenth Report*, 26 FCC Rcd 9664, ¶ 308 (2011) (“15th Report”).

¹⁴ Densification is the process by which network capacity (in terms of bits per second) is increased when multiple cellular base stations are used to cover the same area as a single base station. Multiple base stations allow a network operator to disburse the demand that its customers place on the network across multiple sites, which effectively increases network capacity.

¹⁵ 4G AMERICAS, DEVELOPING AND INTEGRATING A HIGH PERFORMANCE HET-NET 2 (Oct. 2012).

¹⁶ See Public Notice, at 12.

and the wireless infrastructure providers. As a result, carriers' non-spectrum capital expenditures have been rising steadily: from \$25.4 billion in 2011 and \$28.8 billion in 2012, to a projected \$32.2 billion in 2013.¹⁷

One of the primary areas of investment for the industry is the continued upgrade and transition to 4G LTE technology.¹⁸ Capital expenditures in LTE increased from \$2.2 billion in 2011 to \$7.9 billion in 2012, an increase of 259 percent.¹⁹ The majority of this spending was in the radio access network ("RAN") layer, which includes antennas, base stations and associated equipment. LTE RAN spending increased from \$1.6 billion in 2011 to \$5.8 billion in 2012, an increase of 262 percent.²⁰

The wireless infrastructure segment also increased its capital expenditures from 2011 to 2012. The largest, publicly-traded infrastructure companies alone made capital expenditures of approximately \$1.16 billion in 2012,²¹ from \$1.02 billion in 2011.²² Capital expenditures for 2013 are projected to be between \$1.3 and \$1.5 billion.²³ Significant portions of these capital expenditures are dedicated to network improvement, including new site construction and improvements to existing sites to accommodate more carrier facilities. In 2012, these network

¹⁷ RBC, DATA 2013: SECTOR REVIEW AND OUTLOOK FOR CARRIERS AND INFRASTRUCTURE PROVIDERS 9 (Jan. 17, 2013) ("RBC Report").

¹⁸ See Public Notice, at 7. See generally RBC Report, at 16 ("2013 will be the first year when all four national carriers will be deploying 4G LTE").

¹⁹ iGR, U.S. LTE NETWORK INFRASTRUCTURE CAPEX SPENDING FORECAST, 2011-2016 (2013).

²⁰ *Id.*

²¹ *Annual Report*, AMERICAN TOWER CO., 45 (Apr. 11, 2013) ("ATC Report"); *Annual Report*, CROWN CASTLE INT'L, 26-27 (Feb. 12, 2013) ("CCI Report"); *Annual Report*, SBA COMM., 42 (2013) ("SBA 2012 Report"); *Annual Report*, SBA COMM., 43 (2012) ("SBA 2011 Report") (excluding acquisitions of existing infrastructure to the extent possible).

²² ATC Report, at 45; CCI Report, at 26-27; SBA 2012 Report, at 42; SBA 2011 Report, at 43 (excluding acquisitions of existing infrastructure to the extent possible).

²³ ATC Report, at 45; CCI Report, at 26-27; SBA 2012 Report, at 43.

improvement expenditures totaled approximately \$658 million, compared to \$306 million in 2011.²⁴ Such investments are projected to be up to \$917 million in 2013.²⁵

This data represents capital expenditures by publicly-traded wireless infrastructure providers only. PCIA anticipates the rest of the infrastructure industry to increase its capital expenditures in a similar fashion to accommodate carriers' aggressive network upgrade schedules.

B. The Macro Site Industry Is Highly Competitive and Fosters Competition Across the Wireless Ecosystem

The macro site market is a critical component within the wireless industry. Wireless support structures, including towers, provide coverage over broad areas, but can also be leveraged in network densification to address capacity issues. Ownership in this infrastructure segment is highly diverse and includes publicly-traded carriers and infrastructure companies, mid-size and small tower companies,²⁶ utilities, governments, broadcasters, and railroads.

The market for independently-owned macro sites exemplifies the robust competition within the wireless infrastructure industry. In this market, "third party neutral-host" providers act as landlords for the carriers who place their equipment on the support facility. Neutral-host providers have the business incentive to make space available to a variety of carrier tenants, which facilitates the rapid deployment of competitors' facilities. In turn, this rapid deployment provides carriers with a cost-effective and time-efficient method of market-entry and service, and simplifies network technology upgrades, all of which are key factors on which carriers compete.

²⁴ ATC Report, at 45; CCI Report, at 26-27; SBA 2012 Report, at 42; SBA 2011 Report, at 43.

²⁵ ATC Report, at 45; CCI Report, at 20, 26-27; *Quarterly Report*, SBA COMM., 33 (May 10, 2013) (projecting 1Q equivalent over remaining three quarters).

²⁶ For example, mid-size companies include: Global Tower Partners, KGI Wireless, and InSite Wireless.

The three publicly-traded neutral host providers – Crown Castle, American Tower and SBA Communications – own and operate over 66,000 towers while the wireless carriers, including Verizon, Sprint, U.S. Cellular, and AT&T, own and operate over 24,000 towers. PCIA members report that, on average, a new wireless support structure costs approximately \$250,000 to \$300,000. In comparison, PCIA members estimate that an average collocation of wireless equipment on an existing support structure costs less than 25 percent of the total cost of a new support structure. A tower can accommodate anywhere between five and six tenants on average,²⁷ and analyst reports estimate that the public infrastructure companies have an average of 2.75 tenants per tower.²⁸

Capacity for new cell sites and upgrades is essential as carriers are projected to add an additional 18,000 to 27,000 sites in 2013, up from an estimated 16,000 to 18,000 sites in 2012.²⁹ This rapid growth is expected to continue as the demand for coverage and capacity continues to grow.³⁰ Since the cost of adding a collocation or a modification to an existing tower or a site is fractional when compared to building a new tower, carrier interest in collocation is expected to increase.

C. Carriers Are Leveraging A Variety Of Infrastructure Solutions To Create Heterogeneous Networks

Wireless service providers are proceeding with plans to incorporate more small cells and smart technologies into their networks.³¹ For example, AT&T has projected the deployment of

²⁷ 15th Report ¶ 309.

²⁸ Clayton Funk & Jason Nicolay, *Trends and Forecasts for the Wireless and Tower Industries*, AGL MAGAZINE, July-Aug. 2012 at 66.

²⁹ RBC Report, at 42 (estimates include upgrades of existing cell sites).

³⁰ See *supra* Section II.A.

³¹ See, e.g., Phil Goldstein, *Verizon Taps Alcatel-Lucent, Ericsson for LTE Small Cells*, FIERCEWIRELESS, <http://www.fiercewireless.com/story/verizon-taps-alcatel-lucent-ericsson-lte-small-cells/2013-05-21> (last visited June 17, 2013); Kevin Fitchard, *Sprint Has Big Plans for Small Cells*, GIGAOM,

40,000 small cells and 1,000 DAS by 2015.³² The AT&T plan is estimated to include \$80–\$200 million for the small cell radio equipment with an installed cost that may be a factor of three to six times higher (\$6,000 to \$30,000 per site).³³

Taken as a whole, Infonetics estimates that the small cell market will grow at a five-year CAGR of 68% from 2011-2016 to \$2.3 billion, driven largely by 4G/LTE deployments.³⁴ The semiconductors necessary to support these intelligent devices alone are estimated to be a \$2 billion industry by 2016.³⁵ Further, in examining one segment of the broader small cell market, the number of Mini eNodeB or LTE small cells deployed is projected to increase 800% from 2012 to 2013.³⁶

DAS are another way that carriers are responding to the growing demand for wireless services. The advantage of using DAS is that each can be customized to the needs of a particular location, network, or other variable. They are deployed to address coverage and capacity issues indoors, outdoors, and even underground.³⁷ There are over 10,000 nodes currently deployed in the U.S.³⁸ DAS and small cell solutions will continue to be a strong driver of competition today and into the future.

http://gigaom.com/2012/05/09/sprint-has-big-plans-for-small-cells/?utm_source=feedburner (last visited June 17, 2013)

³² *AT&T: 40,000 Small Cells*, DAILY WIRELESS, <http://www.dailywireless.org/2012/11/07/65675/> (last visited June 17, 2013).

³³ RAYMOND JAMES & ASSOCIATES, *GROWING BIG NETWORKS WITH SMALL CELLS: RAMIFICATIONS FOR THE SUPPLY CHAIN 1* (Nov. 20, 2012) (“Raymond James Report”).

³⁴ *Id.* at 6.

³⁵ *Id.* at 1.

³⁶ *Id.* at 21.

³⁷ Tammy Parker, *All Four National Mobile Carriers to Use NYC Subway DAS*, FIERCEBROADBANDWIRELESS (Apr. 28, 2013), http://www.fiercebroadbandwireless.com/story/all-four-national-mobile-carriers-use-nyc-subway-das/2013-04-28?utm_medium=nl&utm_source=internal.

³⁸ Raymond James Report, at 1.

III. BARRIERS TO INFRASTRUCTURE DEPLOYMENT CONTINUE TO NEGATIVELY IMPACT THE GROWTH OF WIRELESS INFRASTRUCTURE AND SHOULD BE MITIGATED OR REMOVED

The Commission should continue to identify and mitigate regulatory barriers that diminish infrastructure investment. Wireless infrastructure is a critical resource for the wireless industry, and, as noted above, the industry invests heavily in its deployment. That investment is necessary to keep pace with consumer demand because spectrum resources require extended periods of time of development to bring online; meanwhile, mobile data usage is projected to grow approximately 850% by 2017.³⁹

The diverse regulatory environment governing infrastructure deployment is challenging. State and local governments heavily regulate wireless infrastructure. Often, it is viewed not as a means of improving public safety or bringing the benefits of broadband to citizens, but as an unnecessary intrusion into the community.⁴⁰ This is true for large infrastructure, such as monopole towers, as well as for small cells and DAS. It is even true for collocations and relatively minor modifications of existing facilities, which local ordinances frequently subject to the same burdensome application requirements as new facilities.

The Commission recognizes that lowering barriers to infrastructure deployment will allow carriers to densify networks faster, deploy new spectrum more quickly, and lay the groundwork for rapid technological upgrades from 3G to 4G and beyond.⁴¹ Most recently, the Commission made significant progress when it established a policy position on section 6409 of

³⁹ See CISCO, *supra* note 9, at 14 (calculating the percentage change in data traffic for the North America geography from 2012 to 2017).

⁴⁰ See, e.g., Vic Lee, *Hillsborough Residents Oppose New Cell Towers*, KGO-TV SAN FRANCISCO, CA (Mar. 15, 2013), <http://abclocal.go.com/kgo/story?section=news/local/peninsula&id=9029667>.

⁴¹ *In re* Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions with Respect to Mobile Wireless, Including Commercial Mobile Services, *Sixteenth Report*, 28 FCC Rcd. 3700, ¶ 317 (2013).

the Middle Class Tax Relief and Job Creation Act of 2012,⁴² which requires municipal authorities to approve zoning applications for insubstantial modifications to wireless facilities. The FCC acted to address ambiguities in the language of section 6409 that were making it difficult for municipalities to understand how the Act affects their zoning processes.⁴³ In several instances, the FCC's action has been persuasive to municipalities that were awaiting further clarification, paving the way for faster deployment.

PCIA is encouraged by this progress and is doing its part to promote a consistent understanding of the law. Nonetheless, the march toward a uniform interpretation of section 6409 is incremental and far from complete. The FCC should carefully monitor the progress of section 6409 application and act immediately to address inconsistencies in its interpretation. Like a kindergarten game of Telephone, cumulative errors could have the effect of creating patchwork regulation.

The FCC should be especially sensitive to the regulatory environment governing small cells. Small cells are a critical element of the HetNet.⁴⁴ Their size makes them ideal for targeted coverage in areas that have limited or no capability to host large infrastructure, such as environmentally-sensitive or historically-significant areas. Yet, environmental and historic regulations recognize none of these benefits. This hampers small cell investment at a time when infrastructure is badly needed.

⁴² Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, § 6409(a) (2012).

⁴³ Wireless Telecommunications Bureau Offers Guidance on Interpretation of Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012, *Public Notice*, 28 FCC Rcd. 1 (Jan. 25, 2012), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-12-2047A1_Rcd.pdf.

⁴⁴ See Amos J. Loveday, *DAS/Small Cells & Historic Preservation: An Analysis of the Impact of Historic Preservation Rules on Distributed Antenna Systems and Small Cell Deployment*, ATCHLEY HARDIN LANE, LLC, 1-2 (Feb. 27, 2013) ("Loveday Report"), available at <http://apps.fcc.gov/ecfs/document/view?id=7022132596>.

The FCC should issue a rulemaking to add DAS and small cell solutions to the list of facilities that are categorically excluded from non-RF-related environmental processing in Note 1 to 47 C.F.R. § 1.1306.⁴⁵ Such a rulemaking would be an additional hurdle cleared in the Commission's march to ubiquitous mobile broadband.⁴⁶

DAS and small cells are frequently deployed on existing utility poles and similar infrastructure within existing aerial corridors of prior or permitted use. A DAS installation, for example, has a series of small nodes connected with fiber optic or coaxial cables, usually along the public rights-of-way on utility poles.⁴⁷ However, uncertainties surrounding the application of the FCC's historic preservation and environmental rules to these new technologies can make DAS and small cell deployment more difficult, or thwart it entirely.⁴⁸ As PCIA has explained to the Commission previously, creating a Note 1 exemption for DAS and small cells would alleviate a burden on a technology that the wireless industry is increasingly reliant upon.

⁴⁵ See PCIA – The Wireless Infrastructure Association Ex Parte Communication, WC Docket No. 11-59, GN Docket No. 12-354, at 2-3 (Mar. 19, 2013), *available at* <http://apps.fcc.gov/ecfs/document/view?id=7022132595>.

⁴⁶ See *A National Strategy: The FCC's Broadband Acceleration Initiative*, FCC, http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-304571A2.pdf (last visited Mar. 19, 2013). See also Statement of Ajit Pai, Commissioner, FCC, Hearing Before the Committee on Commerce, Science, and Transportation of the United States Senate, "Oversight of the Federal Communications Commission," at 8 (Mar. 12, 2013), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-319469A1.pdf ("[W]e should modernize our rules to exempt distributed antenna systems (DAS) from our environmental processing requirements, except for rules involving radiofrequency emissions. We can do this if a technology is 'deemed to have no significant effect on the quality of the human environment.' Given their small size and appearance, I believe that DAS meet this standard. We should similarly update our historic preservation regulations, yet another regulatory layer, to facilitate deployment of DAS and small cells that add capacity to networks.").

⁴⁷ See Loveday Report, at 1-2, 5, 8.

⁴⁸ See *id.* at 2-5.

IV. CONCLUSION

Infrastructure providers and carriers are investing billions of dollars to build out America's wireless networks. In turn these network investments foster competition across the wireless industry. To sustain robust competition and U.S. leadership in next-generation wireless services and infrastructure, PCIA urges the Commission to support their efforts by identifying and lowering regulatory barriers to infrastructure investment.

Respectfully submitted,

PCIA – THE WIRELESS
INFRASTRUCTURE ASSOCIATION
AND THE HETNET FORUM

/s/ Jonathan M. Campbell
Jonathan M. Campbell
Director, Government Affairs

D. Zachary Champ
Government Affairs Counsel

Alexander Blake Reynolds
Government Affairs Counsel

PCIA – THE WIRELESS
INFRASTRUCTURE ASSOCIATION
500 Montgomery Street, Suite 500
Alexandria, VA 22314
(703) 739-0300

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